Resource Sharing!

Altair

Intel

T.V. Typewriters

COMPUTER ART

FRED MOORE

CCD's

light pens

965 - IBM - 07

THE CLUB IS ALL OF US

We're growing—about 60 members so far. Meetings have been loose which I think is good. Gordon keeps the discussion moving as our chairperson. Do we need more of an agenda?

Last time we had general club business and news first, followed by Gordon giving us a good introduction to what the machine does with the code we lay on it. I'd like to see this topic continued and some specific routines followed thru step-by-step. Amateurs that we are and limited by our small memories, we are going to be talking assembly or machine language if we want our CPU to do more than process what we say. Learning good coding habits can save hours and headaches as well.

Then again, since most of us don't have a system up yet, it may be too early for software discussions. What topic do we want for future meetings? Terminals? Memory? I/O interface problems? What? It would be nice to have a program focus for each meeting announced in advance in the newsletter. Anyone want to bring and give a demonstration of her/his system?

I'm intending to get the newsletter out once a month. As Lee suggested, it will be mostly *a pointer* to sources, items, news, etc. Sort of an identifier of people, places, articles, abstracts, and general information of interest to club members. It can serve as a link between members: who has what to share or who needs what. And that includes all of us. We each know something or have something—even if it is only time or energy. The assumption is we are all learners and doers. Right? The function of the club and the newsletter is to facilitate our access to each other and the micro-world out there.

You know something of interest to the club: let us all know. Put it down on paper, scratch paper, anything, and get it to the editor. If it is long, just jot a quick descriptive review (use keywords) and tell where it can be had (complete address). Or send a copy to me to be kept in the club library (a filing cabinet). If there is a high demand for the item, PCC is willing to xerox copies at cost. By the way, if you have recent or back issues of electronic magazines and micro-computer stuff, how 'bout donating them to the library?

All those new to the club, please fill out a Survey Questionaire which I'll take to mean you are an active member. Also be sure to put a dollar in the hat at the next meeting—our expenses are increasing. Larger donations welcome.

Looking over the Questionaires that have been turned in, I see we have a lot of talented, skilled, and imaginative people. The club names suggested are: Infinitesmal Computer Club, Midget Brains, Steam Beer Computer Group, µComputer Users Group, People's Computer Club, Eight-Bit Byte Bangers, Micro-Processors, Bay Area Computer Experimentors Group, and Amateur Computer Club of America.

The question "What would you like the club to do? Goals?" brought these responses: Perhaps the club can be a central REPRO & disemenation point for hard-to-otherwise-get listings & schematics, paper tape sources and binaries AS WELL AS a place where software written in PL/M be compiled, simulated, etc., for creating working or usable binaries. . . . info exchange on line systems, standardization of info exchange. . . . meet to exchange ideas, share skills, problems and solutions. Maintain a work bench somewhere with a scope, VTVM, etc. Circulate a local news-letter and contribute to a wider circulation newspaper when appropriate.

Particularly maintain a local resource file with reciprocal arrangements with contiguous groups. . . . Exchange information. . . . mostly an information and learning center. . . . to offer a chance to get together and exchange ideas on software and hardware. . . . serve as information exchange medium; run technical discussion & education sessions. . . . I would like to see information exchange on both hardware and software; volume buying and such would be great to get prices down on electronic equipment. . . . regular exchange of information software or hardware for the benefit of all. . . . provide exchange of technical data & access to hardware & software items. . . . info source 8080, etc., clearing house software systems & applications; maintain computerized xref abilities, and interests. . . . share skills. . . . perform want-ad matching so that people can find what they want to have. Assemble indexes and consumer infor about types of things we usually want: CPU chips, CPU boxes, modems, terminals, floppydisks, PTR/PTP units, TTL et al chips supply, test equipment available for loan or buy or rent, generally-useful software, individual specific routines people have written. . . . share ideas and stop trying to have many small businessmen trying to make a few dollars. Should try to have some standards, but the club will be healthier if everyone has different applications—good ideas for the others. . . . information exchange, specialized equipment access, group projects. . . . information exchange on software & hardware availability. . . . obtain and list where current information is available, identify worthwhile newsletters, publications. . . . get a computer on line. . . . general interchange on uses & construction, quantity discount, prying info loose from companys not anxious to waste time talking to individuals. . . . people should demo their work to keep club interest high; a good demo can make a very interesting meeting.

Quite a lot of worthwhile goals! Anymore? I have listed our individual plans, needs, wants, and offerings on the following pages.

Thanks to Dan and Dave for the UART chips and for the Microprocessor scorecard included in this issue. Thanks to Ed for a donation of some *EDN's* for the library. Thanks to Keith for really spreading the word about the club. Thanks to Fritz for the cover sketch. And a special thanks to Gordon for Part I of his software presentation and doing a fine job of chairing the meetings. —*Fred*

Club Treasury Report:

INCOME: From Gordon's suggestion that each member donate a dollar, we collected $23.63 at the first meeting, $22.00 at the second, and $7.00 at the third gathering, for a total of $52.63.

EXPENSES: The initial post card announcement cost $8.00. First newsletter cost $10.90 for xeroxing and $4.00 postage. Second meeting card cost 2.29 xerox and $5.20 postage. Total spent $30.39.

BALANCE: As of April 2, 1975, the club has $22.24. The copying and mailing of this newsletter will cost most if not more than this amount—leaving the cupboard bare. Suggestions?

HARDWARE/SOFTWARE?

LAST MEETING I BROUGHT UP THE SUBJECT OF CROSS ASSEMBLERS.
JUDGING BY THE NUMBER OF BLANK STARES, THERE ARE A LOT OF HARDWARE
PEOPLE IN OUR MIDST. MAYBE A FEW WORDS MIGHT BE HELPFUL.

ONCE YOU GET YOUR WHIZBANG-II WORKING (WHIZBANG-I WAS OBSOLETE
BEFORE YOU GOT IT BUILT) YOU WILL BEGIN TO THINK ABOUT WHAT IT WAS THAT
YOU WERE GOING TO USE IT FOR. WHEN YOU DECIDE, YOU WILL HAVE DISCOVERED
SOFTWARE. NOW SOFTWARE COMES IN ALL SHAPES AND SIZES IF WHIZBANG IS
GOING TO DO MORE THAN ONE THING ONLY. AND THE BIG DIFFERENCE IS THAT
SOFTWARE IS A LOT MORE DIFFICULT TO BUILD THAN HARDWARE. AND WHAT'S
WORSE, YOU NEED A LOT OF HARDWARE TO BUILD SOFTWARE. A LOT OF MINIS
THAT I'VE USED CAN'T EVEN BEGIN TO ASSEMBLE THEIR OWN SOFTWARE
UNTIL THAT MEMORY BOX HAS AT LEAST 4K OF ROOM. NOW SINCE WE ARE NOT
THE FIRST TO RUN INTO THE PROBLEM, ONE SOLUTION THAT SOME OF THE OLD
TIMERS CAME UP WITH WAS TO USE THAT BIG BLAPWOMP-359 THAT THE BEAN
COUNTERS WERE USING TO WRITE YOUR CHECK. HIGH SPEED LINE PRINTER,
BEACOUP CORE BOX, ALL PAID FOR AND JUST SITTING THERE. THE CROSS
ASSEMBLER WAS BORN. USE A BIG COMPUTER TO ASSEMBLE INSTRUCTIONS FOR
A LITTLE ONE. FINE! BUT WHERE'S THE SOFTWARE FOR THAT?

NOW SINCE ONLY A FEW OF US WHO ARE MAKING OUR VERY OWN CAN GET
ON THE BLAPWOMP WITHOUT BEING CHARGED FOR TIME, AND THOSE OF US WHO
CAN CAN'T BE EXPECTED TO ASSEMBLE ALL THE SOFTWARE THIS CLUB IS ABOUT
TO PRODUCE, I SUGGEST THAT WE USE A TIME-SHARED COMPUTER INSTEAD
OF THE BLAPWOMP, AND SOME OF THE SOFTWARE PEOPLE IN THE GROUP CAN GET
THE CROSS ASSEMBLER PROGRAM UP AND WORKING, SO WE CAN ALL HAVE ACCESS
TO IT. THE BILLING ARRANGEMENTS CAN COME LATER.

I SUPPOSE THAT I FORGOT THAT MOST OF YOU ARE STILL IN THE THROWS
OF GETTING THE HARDWARE WORKING, BUT SOONER OR LATER WE ARE GOING
TO NEED ONE OR MORE CROSS ASSEMBLERS. WHEN WE DO, I'LL BRING IT UP
AGAIN.

MEANWHILE, IF ANYBODY WHO HAS A SLICK SOLUTION TO THE PROBLEM
OF SOFTWARE DEVELOPMENT (FOR CHEAP) PLEASE SPEAK UP.

A FINAL NOTE. BOB LASH INVITED ME OVER TO SEE HIS 12 BIT MACHINE
AND IT REALLY IS A PIP! HE SHOWED ME HOW IT COULD COUNT UPWARDS WITH
ONE REGISTER AND DOWNWARDS WITH ANOTHER SIMULTANIOUSLY. ALL THIS
BECAUSE IT IS MICRO-CODED. A TRIVIAL PIECE OF BIT MANIPULATION, PERHAPS
BUT NOT A TRIVIAL UNDERTAKING. ESPECIALL CONSIDERING BOB'S AGE, THIS
COMPUTER (AND IT'S OWNER) ARE TRUELY REMARKABLE. A VERY
FINE PIECE OF WORK BY ANY ONE'S MEASURE.

NEXT MEETING WEDNESDAY, APRIL 16,
7 PM at Peninsula School in Auditorium room.
Directions: From freeway 101 take the Willow
Road exit west toward Menlo Park. Turn right
on Coleman Ave.; turn right on Berkeley Ave.;
turn left on Peninsula Way, and you are here.
The auditorium is in the large old wood house.
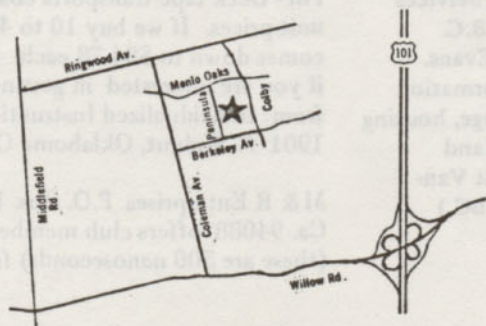
MITS, Inc. P.O. Box 8636 Albuquerque,
New Mexico 87108 (tel. 505-265-7553) has
formed an Altair User's Club. Membership
free to everyone who buys an Altair Computer.
Associate membership is $30.00 per year.
Membership includes: year subscription to a
newsletter, service desk phone number, trade
for program listings from software library,
and contest with prizes for best subroutine
and major program submitted.

John McCarthy suggests the forming of a
Bay Area Home Terminal Club to provide
a home service on a time-shared computer
(PDP - 10 or PDP - 11 possibly) at $75
estimated per month not including terminal
or communication costs. Anyone interested
contact him %Computer Science Dept.,
Stanford, Ca. 94305 or ARPANET JMC at
SU - AI. (Note: John is now in Japan for
three months.)

Dear Fred,

Sounds like you had a fun meeting. We got a local group meeting together last night and had 18 people show. Four from Santa Barbara, one from Paso Robles and the rest from Lompoc & Santa Maria.

Thanks for the copy of the Bay Area Newsletter. Lets continue to trade copies.

Sincerely,
Hal Singer, Micro-8

Computer Indexing System

This is the very crude beginning of a ham-radio-based information service, but it is a beginning. Mitt Nodacker, WA7TFE, feels that RTTY is the logical mode to use in an information transfer system, and is working with a number of other hams and computer enthusiasts to set up such a network. Mark Barker, K3RZG/2, has suggested in considerable detail a computer indexing system which would allow large numbers of hams to register their interests and areas of competence in a computer memory. An individual wanting information on a particular subject could query the computer (by RTTY perhaps) and find out who to contact. Since there are IC chips available which permit conversion from 5-bit/start/stop Baudot (RTTY) code to 8-bit ASCII (computer) code and vice versa, computer-RTTY tie-ins are quite possible. Mitt is coordinating the activities of the RTTY Technical Group and if you'd like to get involved in this end of things, write to him at Box 8557, Pocatello, Idaho 83209.

(excerpt from Copthorne WØORX MacDonald's column in the March '75 issue of *CQ* magazine.)

COMPUTER NEWSLETTER

A few of us in Denver are forming a support group of experimenters in microprocessors, their peripherals and programs. We are interested in providing a clearinghouse distribution service with particular emphasis on the Mark-8 Minicomputer and TV Typewriter. As many are aware, support from manufacturers to the individual experimenter is practically non-existent and comprehensive information exchange is difficult among individuals. We hope that a clearinghouse library service will help alleviate this situation.

The first major areas of interest are: Programs, Programming Aids, Circuits (Extensions and Modifications), Peripherals (TV Typewriter, Cassette Drives, Floppy Disk, etc.), BASIC Compiler Development, Suppliers of Parts and Literature, General Information. Others (as suggested).

We expect to produce a monthly newsletter containing abstracts of what is available and general information. Anyone with an interest in or a contribution/suggestion for the clearinghouse should send a stamped self-addressed envelope to: The Digital Group Clearinghouse, P.O. Box 6528, Denver, CO 80209.

We hope this service will prove valuable and rewarding to all participants.
THE DIGITAL GROUP
CLEARINGHOUSE
Denver, CO

Publications:

Latest *The Computer Hobbyist* (Feb. '75) has a good evaluation of microprocessors by Hal Chamberlin.

Latest *People's Computer Company* issue has a lot of good info on home computing.

What To Do After You Hit Return or *P.C.C.'s First Book of Computer Games*, now available for $6.95 from People's Computer Company P.O. Box 310 Menlo Park, Ca. 94025 (tel. 415-323-6117). This 157 page oversize book has descriptions and sample runs of 48 games with listings in HP 2000F BASIC.

Microcomputer Design by Donald P. Martin, president of Martin Research Ltd. 1825 South Halsted St., Chicago, Ill. 60608 (tel. 312-829-6932). This book covers the basic design applications of the 8008. Book available for $75.

SIGMICRO %ACM, P.O. Box 355 Sunnyvale, Ca. 94088 (tel. 415-325-2962) Subscription $2. (Announcements of meetings about microprogrammed computers and micro-computers.) Contact Dennis Allison for more info.

MICROCOMPUTER DIGEST, P.O. Box 1167 Cupertino, Ca. 95014 (tel. 408-247-8940) Contact Darrell Crow, editor. Subscription $28. (Latest news, developments, applications, products, companies, and industry trends in microcomputers and processors.)

ELECTRONOTES, Newsletter of the Musical Engineering Group, 203 Snyder Hill Road, Ithaca, N.Y. 14850. Subscription $16. Contact Bernie Hutchins, editor. (Over 50 issues of ideas, designs, and revisions of digital electronic music synthesizers)

RAIN, Environmental Education Center, Portland State University, P.O. Box 751 Portland, Or. 97207 (tel. 503-224-9500) (Monthly newsletter of ECO-NET. Keyword index of environmental/energy related and communications kinds of info in the N.W.)

INFACT, Community Computer Services 1877 West 4th Ave., Vancouver, B.C. (tel. 604-733-8310) Contact Gil Evans. (Computer-based community information system useful as a learning exchange, housing registry, electronic bulletin board and community memory. Terminals at Vancouver Community College and UBC.)

Local Supply Sources:

James Electronics
P.O. Box 822 Belmont, Ca. 94002
(tel. 415-592-8097)
(has I C's, components, mail order and phone orders)

Bill Godbout Electronics
Box 2673 Oakland Airport, Ca. 94614
(has I C's, components, memories, etc., mail order)

International Electronics Unlimited
P.O. Box 1708 Monterey, Ca. 93940
(tel. 408-659-3171)
(components, etc., mail order)

Mike Quinn Electronics
Building 727
Oakland Airport
(IC's, components, etc.)
(tel. 569-1539)

Solid State Music
2102 A Walsh
Sunnyvale, Ca.
(IC's, components, etc.)

Haltek Electronics
1690 Plymouth
Mountain View, Ca.
(buy & sell used equipment, components, etc.)
(tel. 969-0510)

Mini-Computer Exchange
12601 Henrietta Ave.
Sunnyvale, Ca. 94086
(used computers, terminals, buy, sell, & trade)
(tel. 408-733-4400)

Haited Specialties Co.
915 Kifer Road, Sunnyvale, Ca.
(tel. 408-732-1573 or 415-969-1448)

CROMEMCO 26655 Laurel Lane, Los Altos, Ca. 94022 (tel. 415-941-2967) offers an image sensing module kit for $90. Useful as a solid state TV camera and compatible with digital processing systems.

Phi - Deck tape transports cost $94.50 in unit prices. If we buy 10 to 49 the cost comes down to $84.78 each. Contact Ken if you are interested in getting one. Order from: Individualized Instruction Incorp. 1901 N. Walnut, Oklahoma City, Ok. 73105

M & R Enterprises P.O. Box 1011 Sunnyvale, Ca. 94088 offers club members 2102 - 1's (these are 500 nanoseconds) for $4.50 each.

Robert Baer 921 Lincoln Ave., Palo Alto, Ca. 94301 (415-(415-321-9721) is planning an 8080 paper tape/ reader editor and 5 level/ 8 level translator. Hope to buy an Eclipse 5200 system and sell timesharing services (near cost), for use as a public utility via phone. Have done a bit in analog circuity and small-scale design in digital circuitry. Have 2-sided printed circuit capability. Equipment: Tektronex 536 scope with CA,G,T,D,ISI plug-ins , HP VTVM, freq. meter. Suggest Standard number one: CHARACTER SET of all listings to be limited to that common to 5 and 8 level TTY's.

Dave Bowles 4501 Glen Haven Rd., Soquel, Ca. 95073 (tel. 408-462-1750) has Mark 8 running, planning a paper tape substitute using cassette. Use: for system control, audio, games. Skills: hardware. Need: a terminal, and info about phoneme generator hardware/software. Suggests: why not use ASCII .

Keith Britton Box 31 Loma Mar, Ca. 94021 (415-879-0880) is planning to build a TVT for text editing---study & design of blasting rounds, Skills: some Basic & IBM 360 Assembly.

John Calhoun 7442 Circle Hill Dr., Oakland, Ca. 94605 (tel. 638-1414) wants any cross assemblers, interactive cross-assemblers, or simulators which can be made to run onIBM 370.

Jim Callas 631 North San Pedro Road, San Rafael, Ca. 94903 (472-1629) has a TVTypewriter, building a Micro-8, for info storage & retrieval, needs a modem..

Ralph Campbell 827 University Ave., Palo Alto, Ca. 94301 (329-8217) has an Altair, plans to build a TVT, use: for learning, and Cyclops TV camera hook-up. Skill: fortran, basic, logic. Need: static ram and terminal.

Martin Clinton 1945 Edgewood, Palo Alto, Ca. 94303 (321-9160) is assembling SWTS CT-1024 terminal kit. Needs a modem interface. Comment: Please publish agenda for meetings. Maybe run specific series of discussions, then change.

John Draper 1905 Montecito, Apt 6 Mountain View, Ca. 94040 (tel. 964-9041, data phone 965-4210) working on a TVT and modem, use: fourier analysis (real time), skill: Electronic engineer experience, basic. Equipment: scope, signal gen., recommends Call Computer.

Lee Felsenstein 1807 Delaware St., Berkeley, Ca. 94703 (845-4736) has a proven modem circuit (both polarities), designing a "Tom Swift Terminal" stand alone memory bus system---terminal of expandable intelligence using any micro-processor, intended for use as terminal of future community memory public-access information retrival system. Skill: electronic design. Would like to organize an east bay arm through Lawrence Hall of Science.

Fritz Fisher (moving to Berkeley) interested in Hybrid Digital Optical systems for computer art & games. Experience in programming graphics---drawing and animation machines. I know of a paper for a drawing tablet which can be built for $50.

Michael Fremont 1405 University, Palo Alto, Ca. 94301 (321-5210) currently building a microprocessor of Bob Lash's and my design, want to support a hard-copy unit, TVT, a cassette, and hopefully, a floppy with it. Use: IC testing, first-hand experience with systems software, etc. Skill: basic, APL, fortran, and SPL, experience with digital electr. Need: mass memory such as floppy disk and a hard-copy device.

Adalberto, "Al" Gonzalez P.O. Box 6167 , Stanford, Ca. 94305 (327-9047) has MCS4 Prototyping system with 1702 Prom Programmer, Altair 8800, TVT, have access to 2100 HP computer with disk OS. Designing automated Measurement system with minicomputers, plan to design low cost computer terminals. Use: CRT games, text editing, Skills: Electronics, have MS in Digital Circuit Design, have access to full electronics lab; programming: have operational 8080 cross-assembler on an HP2100. Equipment: access to full house test equipment and supplies. Need: paper tape reader mechanical or electrical.

Bernard Greening 1630 Ottawa Ct. #B, Sunnyvale, Ca. 94087 (tel. 408-732-2236) programming: would like to participate in writing an operating system.

Tom Hedges P.O. Box 7747 Stanford, Ca. 94305 (tel. 324-0729) planning an intelligent home terminal, future plans for a home-made mini with disk. I have done quite a bit of machine language programming, worked with PL/M (8008/8080) I also have access to source of RDOS operating system for Nova and source for cross-assem. 8 PL/m for 8008 & 8080. Need: video display or printer for terminal.

Ed Hughot 10409 Johnson Ave. Cupertino, Ca. 95014 (996-8219) have: HP-2114-A, 8K, TTY, card read/punch, cassette, plotter. Planning to get Altair with 24k, TVT. Use: games, hom finance & accounting, text edit, graphics. Need: 80 column TVT, low cost terminal.

Alex Kamradt 1961 Old Middlefield, Mt. View, Ca.94043 (964-9013) has basic timesharing system, working on a TVT and modem, use: sharing and making small computer system, programming skills. Have terminal available for short time use. Need: TVT, modem, form feed for Dec terminal.

Robert Lansdon 27633 Via Cerro Gordo, Los Altos Hills, Ca. 94022 (tel. 941-5959) have 8080 system with noise immunity problems on the unibus, also 16 bit serial CPU. Have designed a 24 bit micro-programmed machine; a 16 bit non micro-coded machine;linear select associative micro-processor. Use: electronic music, fast fourier transforms, transversal filtering. Skills: digital design, error correcting coding , some software experience. Need: a disk. Recommend Chris Clare's book on State Machines (McGraw-Hill). Are there others interested in either programmable architecture or digital signal analysis and synthesis?

Liza Loop LO*OP Center 170 E. Cotati Ave., Cotati, Ca. 94928 (tel. 707-795-0407 or 707-823-6082) have coffee pot, telephone. Working on an Educational Computer Center. Use: programs for 3 to 6 yrs olds in Pilot 73. I am not primarily a computer person. So my greatest contribution is to help professionals communicate with total laymen and kids. Have access to apples, fresh eggs, beautiful countryside. Need: TTY, accoustical coupler. Are there any club members who would like to contribute to LO*OP Center. We need hardware, teachers for Altair kit classes, programming classes, games classes.

Robert Maas P.O. Box 371 Mt. View, Ca. 94040 (323-0720) working on 8080 computer being designed by Ed McGuire. Want to set up an information retrieval and message service network so that all home computers can talk to each other, including automatic dialing to relay messages. Other uses as text editing, computer services (nutition, dating, reminder service, dynamic carpooling. Skill: programming mostly in LISP, ALGOL, assembly, fortran. Need: a terminal & modem for 30 characters/sec. phone-line, hard-copy or full screen, quiet, total cost about $1000 or so, available for month-to-month rental now. Comment: How about more indexing of info so that we can effiently find each other and read/listen to just what we want instead of global meetins and agenda.

Ken McGinnis Box 2078 San Mateo, Ca. 94401 (349-1711) have Altair, 2 Phi-Decks, 4K of 2102's and plan to get 12K more. Use: business, ledgers, medical records. Skill: basic electronics, research ability. Need: floppy disk. Comment: Maybe our club could offer services to other interested people. We should try to expand the membership.

Jim Mehl P.O. Box 632 Los Gatos, Ca. 95030 working on Mark-8. Use: intelligent terminal, personal accounting and record keeping, games, robot experimentation. Skill: compiler design. Need: on line mass storage. Would like information on PROMs &PROM programming and modem principles.

Ted Netoff 4100 - A 35th Ave. Oakland, Ca. 94619 (530-3173) working on Scelbi Microcomputer with Dec Writter II and misc. inputs. Use: general purpose computer. Skill: circuit design, Need: 1702's.

George Oetzel 4090 Orme Ave. Palo Alto, Ca. 94306 (493-5199) have unlimited access to 2 or 3 HP 2100 systems. Skill: assembly language programming, majority on HP 2100.

Tom Pittman 469 E. Branham Ln. San Jose, Ca. 95111 Have MCS-4 system with 4K RAMS, floppy, CRT, ASR33, COSMAC with 4K RAM (shares TTY). Designing $500 computer with direct execution BASIC. Use for program development, service business, games. Skills: TTL logic design, programming in assembler, software system design.

Larry Platzek 21030 Gardena Dr. Cupertino, Ca. 95014 (252-4721) I have a IOMEC model 1011 disk drive & power supply & manuals. Need help on controller. Others are available in Los Angeles area. Want to interface to Altair.

Robert R. Reiling 193 Thompson Square, Mt. View, Ca. 94043 have ASCII keyboard, modem, complete power supply and card cage with cabinet/desk. Planning 8008 type computer probably with MIL type design, and display terminal with x - y type plot. Use: text editing, games, schedule networks such as PERT network, amateur radio RTTY communications. Skills: electronics hardware, publication layout experience, direct mail activities. Equipment: older scope, small regulated power supplies that could be loaned a short time. Need page printer soon. Comment: really appreciate the work you have put in to form club; if I may help the club in some way please tell me.

Dan Sokol 211 Fall Creek, Felton, Ca. 95018 (335-2282) working on 8080 loose to play games, sail my boat navigate, etc. Skill: electronics. Have lots of AMI chips, but no RAMS. Need: a terminal. Would like software sessions!!!

W. E. Wallis 2844 Waverley St. Palo Alto, Ca. 94301 (327-5536) have ASR33 on timeshare. Planning to build peripherals like disc, tape, vidio terminal (72 char.) Use: business related, engineering, games, educational. Skills: air conditioning, heavy installations, power wiring. Need: computer.

Steve Wozniak 20800 Homestead Road # 36K Cupertino, Ca. 95014 (tel. 255-6666) have TVT my own design 65 char/line, 28 lines, 40 chips. Have my own version of Pong, a video game called breakthrough, a NRZI reader for cassettes very simple! Working on a 17 chip TV chess display (includes 3 stored boards); a 30 chip TV display. Skills: digital design, interfacing, I/O devices, short on time, have schematics.
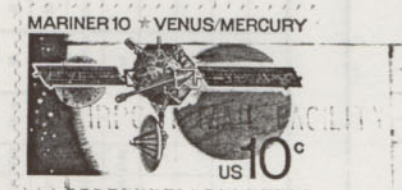
MICROPROCESSOR SCORECARD ©

MICROPROCESSOR SCORECARD	CLASSIFICATION	TECHNOLOGY	WORD SIZE (Data/Instruction)	ADDRESS CAPACITY (Program Words)	CLOCK (kHz/phases)	REGISTER ADD TIME (µsec per Data Word)	ALU	XR	GP	RETURN-STACK SIZE (N × Bits)	VOLTAGES REQUIRED	POWER DISSIPATION	OPERATING TEMPERATURE RANGE (°C)	PACKAGE SIZES (DIP Pins)	PRICE RANGE (approx. 100 qty. CPU)	First Samples	First Deliveries	REMARKS
BURROUGHS MINI-D	8 Bit CPU	PMOS	8/12	256	1000/1	9	3		1	1 × 8	-12, -5		0-70	16	$80	2071	1072	ROM on CPU
ELECTRONIC ARRAYS	8 Bit CPU	NMOS	8/8	64K	1000/2	1	1		15	7 × 16			0-70	40		3075		16 Byte String Operations
FAIRCHILD F-8	8 Bit CPU	NMOS	8/8	64K	2000/0	2	65			(RAM)	+5, -12	6	0-70	40	$75	4074	1075	Clock on Chip
FAIRCHILD PPS-25	4 Bit CPU	PMOS	4.25/12	8656	400/2	62.5	1			4 × 12	-8, -5	6	0-70	16,18,24,40	$80	2071		
INTEL 4004	4 Bit CPU	PMOS	4/8	4K	740/2	10.8	1		16	3 × 12	-15 or (-10,-5)	10	0-70	16	$30	2071	4071	
INTEL 4040	4 Bit CPU	PMOS	4/8	4K	740/2	10.8	1		24	7 × 12	-15 or (-10,-5)	10	0-70	16,24	$40	4074	4074	8K Program Space in Two Banks
INTEL 8008-1	8 Bit CPU	PMOS	8/8	16K	800/2	12.5	1		6	7 × 14	-9, -5	10	0-70	18	$40	4071	1072	Second Source MIL
INTEL 8080	8 Bit CPU	NMOS	8/8	64K	2083/2	2	1		6	(RAM)	-5, -5, +12	10	0-70	40	$200	4073	2074	
INTEL 3001	2 Bit Slice	Bipolar	2M/18	512	808/1	145	2		10	(NONE)	5	4.5	0-70	28,40	$550	3074	3074	
INTERSIL 6100	12 Bit CPU	CMOS	12/12	4K	4000/0	5	2			Main Program	5	.01	-55 - +125	28,40	$175	4074	1075	PDP-8 Code, Clock on Chip
MONOLITHIC MEMORIES 6701	4 Bit ALU	Bipolar	4/17		6664/1	5	3		16	(NONE)	+5	1	0-75	40	$95	1074	2074	
MOSTEK 5065	8 Bit CPU	PMOS	8/8	32K	400/3	10	3			(RAM)	-12, -5, +5	3	0-90	40	$900	1074	3074	3 State CPU
MOTOROLA 6800	8 Bit CPU	NMOS	8/8	64K	1000/2	2	1			(RAM)	+5	25	0-70	24,40	$150	2074	4074	Second Source AMI
NATIONAL CMP-8	8 Bit Slice	PMOS	4M/23	900	/2	16	4	2	1	16 × 4M	-12, +5	7	0-70	40		2075	2075	1 ≤ N ≤ 6
NATIONAL GPC/P	4 Bit Slice	PMOS	4/4	4096	715/4	14	4	2		8 × 8	-12, +5	7	0-70	22,24	$150	1073	3073	
NATIONAL IMP-4	4 Bit CPU	PMOS	4/8		500/4	4.6	1	2	1	7 × 12	-12, +5	10	0-70	24,40		4073	1074	
NATIONAL IMP-8	8 Bit CPU	PMOS	8/8	64K	715/4	4.6	1	2	1	16 × 16	-12, +5	10	0-70	22,24	$230	4073	1074	
NATIONAL IMP-16	16 Bit CPU	PMOS	16/16	64K	715/4	4.6	4	2	2	(RAM)	-12, +5	14	0-70	22,24	$310	1073	2073	16 × 4 Data Stack
RAYTHEON RP-16	4 Bit Slice	CMOS	4M/48	64K	5000/1	1	1		8	(RAM)	5	.01	-55 - +125	48		4074		
RCA COSMAC	8 Bit CPU	CMOS	8/8	64K	2870/1	6	1		1	7 × 16	5-12	.1	-55 - +125	28,40	$300	4074	2075	
ROCKWELL PPS-4	4 Bit CPU	PMOS	4/8	4K	200/2	5	3		1	2 × 12	17	225	0-70	42	$45	1072	2072	(p=2n): 30
ROCKWELL PPS-8	8 Bit CPU	PMOS	8/8	16K	256/2	4	3		2	(RAM)	17	3	0-70	42	$47	4074	1075	8K Program Space in Two Banks
SIGNETICS 2650	8 Bit CPU	NMOS	8/8	32K	1200/1	4.8	1			8 × 15	5	5	0-70	40	$120	4074	1075	
TOSHIBA TLCS-12	12 Bit CPU	NMOS	12/12	4K	1000/3	13	4		6	(RAM)	-5, +5	8	-20 - +80	16,24,28,42	$215	3074	3074	
TRANSITRON TMC/1601	4 Bit Slice	Bipolar	16/16	32K		4	M	V		(RAM)				40		2075	3075	(n+w): 8

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